2009 Transceiver Test
Assessing the New Three-Antenna Transceivers

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Abstract

There has been a great deal of change since the last transceiver test which the Canadian Ski Patrol presented in 1999.[4] Transceivers have changed in their technical construction and as a result of these changes there has been a profound change in how they are used. A number of extra features have been added which may improve finding a buried person. We tested the most common five new transceivers used in BC against the Ortovox F1, an older, single antenna transceiver, which is most commonly used in BC. We first tested the transceivers with 15 certified ski guides who in their workplace used the Ortovox F1. Each guide used all six transceivers in a simulated avalanche.[5] The times to find the two buried transmitters were recorded. We then performed the same program with 15 high school students who had never used transceivers. We staged it so that the novice high school students were divided into three groups, each of which used the transceivers in a different sequence to rule out a learning advantage by using the transceivers in the same order.

The results showed only a small difference in the times of the guide using the new models, with the Ortovox d3 being the fastest and the F1 the slowest even though the F1 is the transceiver they used most often. The results with the students was most interesting. Only four out of ten (two of the three groups) were able to find the second buried transmitter within the seven minute time limit using the Ortovox F1. All students were able to find all the targets with their new model transceivers in their test group. The fastest times were with the Ortovox S1which was slightly faster than the Ortovox d3, Mammut Pulse, Tracker DTS, and the Pieps DSP which finished in that order and quite close together. Clearly the new transceivers are much better in the hands of a novice or irregular user.

Key Words: Avalanche; Transceiver; Avalanche Beacon; Ortovox; Mammut; Pieps; Tracker.

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4 Canadian Ski Patrol System (CSPS) Transceiver Test 1999 presented at IKAR.
5 Training material taken from the user manual of each Transceiver.

Materials and Methods

We received four transceivers from Mammut (Pulse) and Pieps (DSP). Mountain Equipment Coop loaned us four Tracker DTS. Ortovox sent us four d3's and four S1's. We borrowed four Ortovox F1 transceivers from the Canadian Ski Patrol System, Greater Vancouver Zone. We also borrowed the Ortovox remote-controlled test system (five transmitters which can be remotely turned on and off) from Mike Wiegele Heli Ski Resort at Blue River, BC.

The first session took place at Mike Wiegele's Resort in Blue River, using the heli-ski guides as knowledgeable testers. These guides and their clients use the Ortovox F1. We created a simulated avalanche 30 x 50 metres in size and buried the transmitters across the run-out area. The transceiver manufacturers' instructions for use of each transceiver were given to each tester prior to using each transceiver. We randomly turned on two of the five Ortovox transmitters then let each tester (guide) enter at the top end of the "avalanche" to start a search grid until a signal was received, at which time they were to follow the instructions from the applicable transceiver manufacture. The time was measured from the entry until finding the second transmitter. Two different test transmitters were switched on for every test. The results are shown in Appendix 1.

The second session took place at Hemlock Resort just east of Mission, BC. We created a simulated avalanche 30 x 50 metres in size and buried the five Ortovox test transmitters across the run-out area at the base of the "avalanche." The 15 students were divided into three groups and each group had a different sequence of transceivers to test (to remove a learning effect whereby the use of first transceivers could lead to improved times with the later transceivers). Using the transceiver manufactures instructions, the groups were given a 30-minute instruction course with practice prior to the testing of each transceiver. Two of the five test transmitters were switched on and each novice tester was started at the top of the "avalanche," where a normal search pattern was followed until a signal was received, at which time the instructions from the applicable transceiver were followed. The time was measured from "avalanche" entry to marking of the second transmitter. Two different test transmitters were switched on for every test. A time limit of seven minutes was set to find the second transmitter. If this was not achieved the test was declared as "not found." The results are shown in Appendix 2.

Results

In the hands of a knowledgeable user there was only a small difference in search times between the two-antenna and the newer three-antenna transceivers. The fastest was the Ortovox d3 (avg 1 minute 13 sec), then the Tracker (1minute 35 sec), the Pieps (1 minute 36 sec), the Ortovox S1 (1 minute 38 sec) and the Mammut (1 minute 47 sec). The slowest was the Ortovox F1 (at a still respectable 1 minute 56 sec). The standard deviation (STDEV) shows how much variation there was in the times and a low number suggests a more consistent ease of use, ranging from the Ortovox S1 at :23, Ortovox d3 at :31, Tracker at :32, Pieps at :36, Mammut at :47, and the Ortovox F1 at 1:07. In the hands of an expert user there appears to be little difference in the results using the multi-antenna transceivers and all are faster than the F1 which is nearing two decades of use.

6 Time Is Life Video from the International Commission of Alpine Rescue (www.IKAR-CISA.org)
7 Canadian Avalanche Centre (www.avalanche.ca)

The results from the naive users are very interesting! Six out of ten testers failed to find the two targets using the Ortovox F1 in the allotted time. All the naive users did much better using the two and three-antenna transceivers. The fastest was the Ortovox S1 (2 minutes 59 sec), the Ortovox d3 (3 minutes 21 sec), Mammut (3 minutes 25 sec), the Tracker (3 minutes 26 sec,) and the Pieps (3 minutes 34 sec).

Discussion

Both the guides and naive users liked the ease of use and the marking of multiple burials on the screen of the Ortovox S1. The screen of the Ortovox S1 did not seem to be affected by the cold (at times -15C to -20C). The Ortovox d3 was very easy to use but not as easy to find multiple burials as the S1. Both the Ortovox model S1 and d3 also had the best attachment systems.
The Mammut Pulse worked well when correctly set up. It seemed to have too many parameters to set and really needs a lock function to stop a desired setting from being changed. The authors also feel that the "Pulse" feature should not be used on ethical grounds because of questionable reliability. The attachment system is good.

The Pieps DSP worked well but the on-off slider switch which sticks out from the transceiver seemed to present a risk of being easily broken. We also found the deactivation of the transceiver with the special probe presents a risk of abandonment of the buried person if the transceiver is turned off and the probe were to be removed by a person not knowing what had been done. We would advise not to use this feature. The attachment system was not as easy to use as the others.

The Tracker DTS did better than we expected as a two-antenna transceiver being compared to three-antenna models. The pinpointing with this transceiver was more difficult than with a three-antenna transceiver. The authors expect this company will update their transceiver in the near future. When this is done we recommend they also update their attachment system, which was determined to be the poorest.

Conclusions

Any transceiver is better than none! The new three-antenna transceivers are faster in finding a buried person in an avalanche than the older single antenna transceiver. This is especially true for the naive user. Guides or guiding companies using anything other than three-antenna transceivers should consider upgrading. The simpler the transceiver is to use the better. Extra functions such as the pulse detection with the Mammut and the probe switch with the Pieps may have serious ethical problems and detract from the primary goal—find and rescue the buried person.

The "Test Box" from Ortovox for the Ortovox S1 appears to be a very good way to assure full function of each S1 transceiver prior to its use. This will be especially useful for larger operations such as heli and snow cat companies and rescue organizations.

Disclosures

This study was not supported financially or materially by any of the transceiver manufacturers whose equipment was used in this study. The authors, Swangard, Sayer and Gunderson have no

financial ties or conflict to disclose.

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Appendix 1

CSPS / CSGA Transciever Test Results

at Mike Weigele Helecoptor Resort

	I<=		Time mm:ss			=>I
NAME	Ortovox S1	Ortovox d3	Mammut Pulse	Pieps DSP	Tracker DTS	Ortovox F1
Justin	1:45	0:39	1:10	1:05	1:44	0:52
Scott	2:00	0:44	4:00	1:06	1:00	0:31
Ian	1:45	0:50	1:13	1:07	2:00	1:34
Willy	1:30	0:30	2:10	1:08	1:25	2:20
John	2:15	1:01	1:13	1:09	1:07	0:31
Erin	1:10	1:47	0:58	2:18	1:43	2:48
Crosby	1:29	1:08	1:30	1:55	1:13	1:06
Steve	1:27	2:08	2:56	2:57	1:21	1:37
Mike	2:25	1:14	1:24	1:18	2:36	3:36
Jason	1:32	0:57	1:30	2:00	2:02	4:34
Rankin	0:56	1:49	2:11	1:31	1:35	2:04
Mike H.	1:45	0:43	1:45	1:09	1:03	1:31
Erich	1:45	2:05	1:47	2:29	1:20	1:31
Andras	1:10	1:28	1:50	1:44	2:45	1:54
Tim	1:43	1:15	1:22	1:05	1:05	2:45
Avg	1:38	1:13	1:47	1:36	1:35	1:56
Stdev	0:23	0:31	0:47	0:36	0:32	1:07

Appendix 2.

09,01,31& 02,01	CSPS / CSGA Transceiver Test Results : Hemlock Resort						
	I<=		Time mm:ss			=>I	
NAME	Ortovox F1	Tracker DTS	Mammut Pulse	Pieps DSP	Ortovox S1	Ortovox d3	Line Avg
Taylor R	* 07:00		4:00	2:48	1:43	4:11	3:10
Gidron C	* 07:00		3:37	1:36	3:22	2:47	2:50
John D	6:42		3:40	2:03	3:02	4:23	3:17
Indianna C	* 07:00		2:30	4:41	2:20	3:22	3:13
Bryan Fast	* 07:00		3:39	5:00	3:20	3:14	3:48
Jocheon M		2:07	3:22		2:48		2:45
Drenl W		4:24	2:07		2:23		2:58
Chris V		3:23	5:00		3:26		3:56
Ben N		4:59	3:30		3:52		4:07
Nathan R		2:43	2:47		3:42		3:04
John B	3:45	5:00		3:29		3:32	4:00
Lucas D	* 07:00	2:55		5:00		2:38	3:31
Dawson S	6:06	3:35		2:30		1:58	2:41
Stephen S	5:04	2:35		4:53		2:28	3:18
Chuck L	* 07:00	2:48		3:49		5:00	3:52
Avg	6:36	3:26	3:25	3:34	2:59	3:21	3:21
Stdev	No Stdev	1:01	0:48	1:17	0:40	0:56	0:57
	* Note: If the tester did not find the first target by 7 minutes the test was deemed failed						